

REMARKS

Claims 1-6 and 9 are withdrawn from consideration in view of the Response to Restriction Requirement filed on March 23, 2006. Claims 7 and 8 are currently pending.

In the Office Action, the Examiner rejected claims 7 and 8 under 35 U.S.C. § 102(e) as being anticipated by U.S. Publication No. U.S. 2004/0161006 to Chang et al.; rejected claims 7 and 8 under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,621,842 to Dapkus; and rejected claim 7 under 35 U.S.C. § 102(b) as being anticipated by U.S. Publication No. 2002/0075920 to Spruytte et al. Applicants traverse these rejections, at least for the following reasons.

Applicants submit that the applied references of record do not disclose or suggest the quantum cascade layer recited in claim 7 comprising a semiconductor substrate formed of GaAs; and an active layer, disposed on said semiconductor substrate and having a plurality of quantum well light emitting layers, generating light by means of intersubband transitions in a quantum well structure, and a plurality of injection layers, respectively disposed between the plurality of quantum well light emitting layers and forming a cascade structure along with said quantum well light emitting layers. More specifically, claim 7 is directed to a quantum cascade laser (QCL), which is a unipolar laser device that makes use of intersubband transitions, as described in the specification. See, for example, paragraph [0005] of Applicants' specification. On the other hand, the applied references of Chang, Dapkus, and Spruytte mainly disclose structures relating to a vertical cavity surface emitting laser (VCSEL) etc. Applicants submit that the device structures disclosed in these documents are essentially different from the structure of QCL recited in Applicants' claim 7.

In the QCL of claim 7, for example, an active layer includes quantum well light emitting layers, and injection layers respectively disposed between the quantum well light emitting layers,

and thereby a cascade structure of the QCL is formed. Applicants submit that this device structure is significantly different from the device structures disclosed in Chang, Dapkus, and Spruytte.

Specifically, in portions of the specification providing support for the QCL recited in claim 7, each of the plurality of quantum well light emitting layers in the active layer has a quantum well structure, including a well layer and barrier layer, and the light is generated by means of intersubband transitions in this quantum well structure of the quantum well light emitting layer. Further, in the active layer of QCL, the injection layer for forming the cascade structure is disposed between the quantum well light emitting layers as described therein. See, for example, paragraphs [0120] to [0122] of Applicants' specification.

This device structure, which Applicants submit is an important feature providing support for the recitation of the QCL of claim 7, is neither disclosed nor suggested in Chang, Dapkus, and Spruytte. As an example, while there is a description stating that "By way of example, but not limitation, the light-emitting device can be a ..., quantum cascade laser or light emitting diode (LED)" in paragraph [0027] of Chang, Applicants submit that the above-described device structure of QCL in Applicants' claim 7 is not disclosed or suggested in Chang. In the referenced Fig. 8 of Chang, for example, only a single quantum well is described in connection with step 830, whereas Applicants' claim 7 recites a cascade laser structure including a plurality of quantum well light emitting layers. Dapkus and Sprytte also lack a teaching or suggestion of the structure recited in Applicants' claim 7.

For at least the foregoing reasons, Applicants submit that the applied references of record do not disclose or suggest the quantum cascade laser recited in Applicants' claim 7. Accordingly, reconsideration and withdrawal of the rejections applied to claim 7 and its dependent claim 8 are respectfully requested.

CONCLUSION

In view of the foregoing, Applicants respectfully request reconsideration and the timely allowance of the pending claims. Should the Examiner feel that there are any issues outstanding after consideration of this response, the Examiner is invited to contact Applicants' undersigned representative to expedite prosecution.

Respectfully submitted,

DRINKER BIDDLE & REATH LLP

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By:


John G. Smith
Reg. No. 33,818

Customer No. 55694

Drinker Biddle & Reath LLP
1500 K Street, N.W., Suite 1100
Washington, DC 20005-1209
Tel.: (202) 842-8800; Fax: (202) 842-8465